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ABSTRACT

This paper discusses two studies undertaken to investigate the effects of population concentrating on the behavior of human subjects. Particular attention was paid to the space and interpersonal contact dimensions, over time, within a prison setting. Mood state self-reports and the rate of psychosomatic illness complaints were used to determine if inmate volunteers were sensitive to variations in crowding. The findings of these field studies parallel those reported in laboratory studies of crowding: no strong influence of variations in crowding was found. The mood and illness factors, although related to stress in other contexts, did not indicate reliable relationships with variations in crowding. (SJL)

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THE EFFECTS OF CROWDING ON MOOD STATES IN A PRISON ENVIRONMENT

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It has generally been assumed by psychologist and layman alike that crowding (or high population concentration) is stressful to humans and results in pathological behavior. However, many commonly held assumptions about the effects of such crowding have largely been extrapolated from the results of animal experimentation. Calhoun's work (1962) with rats is often used as a basis for predicting human responses to high population concentration. To date, there has been little systematic investigation of the effects of varying degrees of population concentration with human subjects. For example, the relative importance of reduced space and increased interpersonal contact have not been delineated.

In a recent review, Zlutnic and Altman (1971) have amply documented the need for such investigation as has Stokols (1972). The few laboratory studies that have been conducted have shown conflicting results and in most cases suffer from problems of poor design and confounded variables. Freedman (1971) reported a study designed to examine the effects of group size and available space and found no effects on task performance from either variable. More recently (1972) Freedman found that group size and available space affects aggressiveness in sexually homogeneous groups, but no effects were found in sexually heterogeneous groups. Freedman's subjects, as in almost all laboratory studies, were exposed to these conditions for a few hours, which places a severe limitation on the ability to generalize from his

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findings. A more extended laboratory study was conducted by Smith and Haythorn (1972) with highly selected naval volunteers. While this study was not conducted to study the effects of crowding, variations in group size and space were examined. Limited variation in space and group size were observed over a 21-day period, with low space and high group size yielding the highest degree of psychological stress. This study involved only two levels of space limitation (70 or 200 cubic feet) and group sizes of only two or three.

Survey studies have likewise been few in number and reported conflicting results. Schmitt (1957, 1966) indicated that population concentration can affect several measures of social pathology. According to Winsborough (1965), controlling for socioeconomic factors reduced the relationship between crowding and social pathology. In a more recent study, Galle, Gove and McPherson (1972) have reported strong positive relationships between social pathology and population concentration, independent of socioeconomic factors.

The evidence thus far on the effects of crowding is scanty and conflicting. We concluded that a systematic investigation of these effects was needed with particular attention to the space and interpersonal contact dimensions over time. In deciding on an appropriate setting for such investigation, laboratory studies were ruled out for two reasons. First, because ethical considerations preclude the use of experimentally induced stress over long periods of time and second, because the laboratory subject knows that he can expect the stress to be terminated after a brief period of time. Since statistical surveys provide little opportunity for controlled experimentation, and laboratory studies also have limitations, we explored the feasibility of a field setting for crowding research.

The next question was what considerations should determine the particular field setting to be used. First, we needed a setting that would provide a range of crowding degrees within long-term housing arrangements. The second essential characteristic was that we could separate effects of social and spatial density.

We define social density to include both actual and potential interpersonal relationships within a particular housing unit, while spatial density is measured in terms of square footage per man in a particular housing unit.

Possible field settings that were considered and rejected were (1) college dormitories--because of limited range of crowding conditions; (2) submarine crews, because of self-selection; (3) tenement populations, because residents spend varying amounts of time away from the setting. We concluded that the use of a prison setting might overcome the disadvantages of the other field settings and provide some unique advantages as well.

On-site surveys of prisons ranging from municipal jails to maximum security federal prisons at several locations throughout the country convinced us that prisons were indeed an appropriate setting for crowding research. Wide ranges in crowding conditions were found to exist. There was the opportunity for long-term observation and availability of biographical data. In addition, we felt assured of a high volunteer rate because of the non-aversive character of the procedures in most behavioral testing. Of particular importance to us, prison environments allow the possibility of separating social and spatial density factors.

We realize that prison populations differ in some respects from other populations, but we feel that the advantages outweighed the potential disadvantages.

In our initial studies at the Texarkana facility, we have employed two measures that have been reported in other contexts to be sensitive to psychological stress. These are mood state self reports and rate of psychosomatic illness complaints.

Mood state self reports were employed to determine if they would be sensitive to variations in crowding. In our first sample, involving 49 inmate volunteers, none of the scales yielded statistically reliable relationships with spatial density. With regard to social density, only one of the three scales--the anxiety scale--yielded a significant relationship. Even in this case, the relationship was a quite modest positive correlation of .30.

In our most recent second sample, involving 36 inmate volunteers, we obtained no significant relationships among any of the mood states and variations in either spatial or social density. We considered the possibility that the IQ level of the subjects might be a factor. Both samples, however, had a mean IQ of 109. We investigated the possibility that ceiling effects were obscuring the relationships. However, the mean anxiety score on sample one was 8.37 and for sample two, 8.94. Since the maximum possible score is 21, there is much room for upward variation. All of the scores fell into the low to mildly anxious range. The lack of relationship obtained between mood state measures and variations in crowding appear consistent with the general lack of crowding effects reported in laboratory studies.

In the second sample we obtained a measure of rate of psychosomatic illness complaints. This variable has been reported in several past studies to be related to psychological stress. We observed significant differences

in the rate of complaints between low and high social density conditions. However, in this second sample, we were able to obtain total length of confinement data on each volunteer. Social density and total length of confinement proved to be moderately correlated(-.44) and a partial correlation removing the contribution of total length of confinement indicated that there is no relationship between social density and rate of psychosomatic illness. We suspect this same partial dependency of total length of confinement and social density may account for the one positive finding in the first sample between anxiety and social density. Our findings for these two measures then are quite similar to the outcomes reported in laboratory studies of crowding. That is, the most common finding in laboratory studies and in our field investigation which employed mood and illness measures, is no strong influence of variations in crowding. This is not to say, as will be seen in the next paper, that crowding variations have no psychological effects. But, at least, with regard to these two measures, that are related to stress in other contexts, we obtained no reliable relationship to variations in crowding.

We have become convinced on the basis of our own work and past research, that one cannot safely assume that crowding will affect behavior in any substantial way. The effects, when they are detected, will probably be far more subtle than we generally assume.

Finally, we would like to reiterate that the prison environment provides wide and partially independent variations in social and spatial density, and therefore is a useful environment in which to examine the possible contribution of these two variables to human behavior.

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